



National Transportation Safety Board

Marine Accident Brief

Collision between US Fishing Vessel *American Dynasty* and Canadian Naval Frigate *Winnipeg*

Accident no.	DCA13RM018
Vessel names	US fishing vessel <i>American Dynasty</i> ; Canadian Navy frigate <i>Winnipeg</i>
Accident type	Collision
Location	Esquimalt, British Columbia, Canada 48°25.9'N, 123°25.8'W
Date	April 23, 2013
Time	0817 Pacific daylight time (coordinated universal time – 7 hours)
Injuries	Six minor injuries
Damage	More than \$500,000 in damage to the vessels and pier
Environmental damage	None
Weather	Clear; good visibility; northeast winds at 3 knots
Waterway information	Protected harbor and entrance to graving dock; ebbing tide 3.6 feet

On April 23, 2013, at 0817 local time, the US-flag commercial fishing vessel *American Dynasty* was approaching the graving dock at Esquimalt in British Columbia, Canada, when it lost electrical power and propulsion control. The vessel veered off course and collided with a Canadian Navy frigate, HMCS (Her Majesty's Canadian Ship) *Winnipeg* FFH 338 ("*Winnipeg*"), moored nearby. Both vessels sustained extensive structural damage, and the naval pier required repairs. Six shipyard workers suffered minor injuries.



Fishing vessel *American Dynasty* (white vessel at left) and Canadian Naval frigate *Winnipeg* after the collision. (Photo by Transportation Safety Board [TSB] Canada)

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The *American Dynasty*, an ice-classed factory stern trawler, operated in the Pacific Ocean from its home port of Seattle, Washington. Originally designed as an offshore supply vessel, it was converted to a fishing vessel in 1989 and could carry up to 140 factory employees in addition to its required crew of nine. The *American Dynasty* was equipped with two main diesel engines connected to a single hydraulically powered, ducted (shrouded) controllable pitch (CP) propeller. The CP system could be controlled from the bridge or from the engine room. The trawler was also fitted with a single-tunnel bow thruster in the forward section of the hull. For electrical power, the trawler had two main engine shaft pickup generators, an auxiliary diesel generator, and an emergency diesel generator. It also had three sets of 24-volt direct-current emergency batteries.

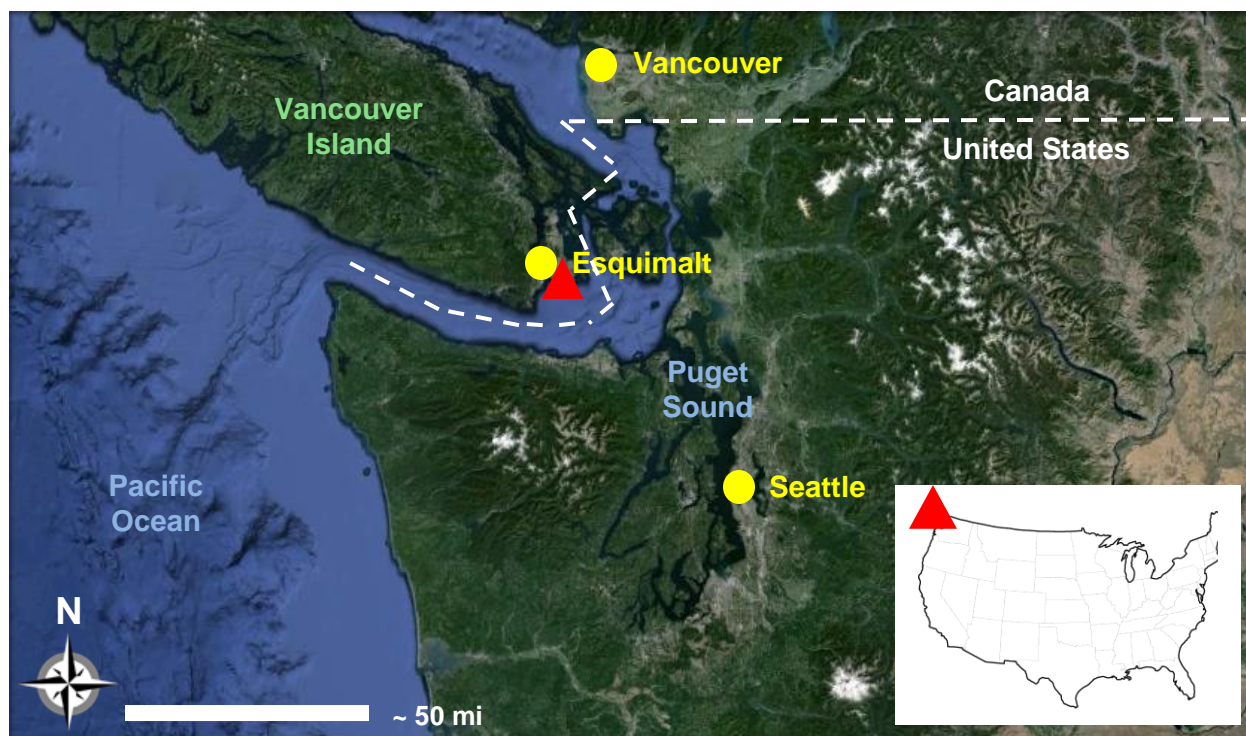


***American Dynasty* at the Esquimalt shipyard after the collision. (Photo by the NTSB)**

On the evening on April 22, 2013, the day before the accident, the *American Dynasty* departed Seattle for an 80-mile voyage through Puget Sound to Esquimalt, on the southeast shore of Vancouver Island, Canada. There, the trawler was to undergo a scheduled dry dock inspection before the start of its next fishing season. While in port in Seattle, the chief engineer had been using the emergency generator on its harbor mode setting to generate electrical power. When in harbor mode, the emergency generator was not able to automatically start in the event of a power loss. Before the *American Dynasty* departed Seattle, the 9-person crew had conducted pre-departure tests of the required equipment. The propulsion control was transferred to the bridge, and about 2205 the *American Dynasty* departed Seattle.

Shortly thereafter, the United States Coast Guard contacted the crew after determining that the trawler's automatic identification system (AIS) was not transmitting. The *American Dynasty* master, who was not the vessel's regular master and served in a relief capacity on this voyage, resolved the AIS problem after consulting the trawler's regular master via telephone, the chief officer, and the owner's manual.

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Satellite image of the Pacific Northwest near the US/Canada border. (Background by Google Earth)

At 0710 the next morning, April 23, the *American Dynasty* boarded a British Columbia coast pilot and an apprentice pilot near Vancouver Island for the approach to Esquimalt. At 0735, the master reduced the CP system to zero-thrust position and maintained the vessel's heading using the bow thruster. At 0805, a docking pilot boarded the *American Dynasty* from the harbor assist vessel *Seaspan Foam*. The *American Dynasty* crew then tied up the *Seaspan Foam* at the trawler's stern. A second harbor assist vessel, the *Charles H. Cates XX*, was tied to the trawler's port bow. Once both assist vessels were secured, the docking pilot assumed control of the *American Dynasty* and, about 0815, he requested that the master shut off both main engines and the radars to prepare for entering the Esquimalt graving dock. The master called the engine room, and the oiler answered (the chief engineer had stepped out to use the restroom). The master did not determine who answered the call, but simply stated that he was transferring propulsion control and then hung up. At 0816, the master transferred the CP control to the engine room. The oiler had never previously accepted propulsion control, and he consulted with the electrician who was in the engine room. The electrician advised the oiler to accept the propulsion control by pushing a button on the CP panel. However, the main engines also needed to be shut off, which the master did not communicate and which the oiler did not know. After accepting propulsion control, the oiler left the room and entered the machinery space to stop an ongoing fuel oil transfer in preparation for the repair facility. The CP system was set at zero pitch, but both main engines were clutched in and turning the propeller shaft. The vessel's speed was 1.6 knots.

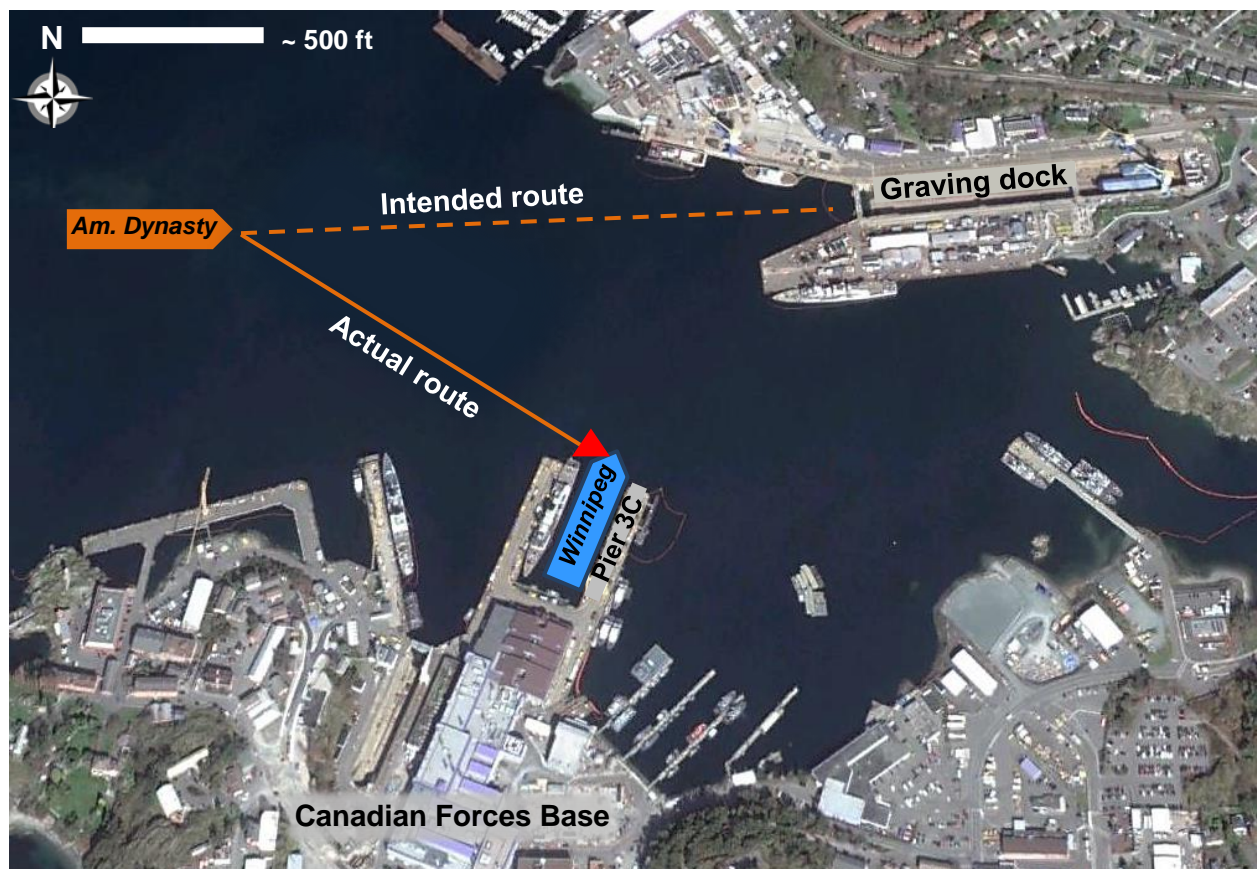
On the bridge, the master continued to shut off navigation equipment. After he had hung up the phone with the oiler, he shut off both steering pumps and the bow thruster motor. About 15 seconds after the propulsion control transfer, the *American Dynasty* experienced a complete loss of electrical power. The auxiliary generator was still running, but the breaker that tied the power to the main electrical power bus had been tripped open. At that point, the trawler was about 2,500 feet from the graving dock entrance. The chief engineer and the oiler quickly returned to the engine room when the power loss occurred. The chief engineer tried to reconnect the auxiliary generator

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to the main switchboard but was unable to. In addition, because the emergency generator had not been changed from harbor to emergency mode after leaving Seattle and was not set to provide emergency backup power in the event of a power loss, the trawler was dark. The CP control system had also lost power. The trawler's main engines were still running and turning the propeller shaft.

On the bridge, the British Columbia coast pilot noticed that the trawler's speed was increasing and that the heading was drifting to starboard toward the Canadian Forces Base in Esquimalt. Also, the master noticed propeller wash behind the vessel and tried to call the engine room using the service phone, but it had lost power and was inoperative. The master could have used the available sound-powered phone or portable radio to contact the engine room, but instead asked the chief officer on the bridge to go to the engine room for an update.

The crews on the harbor assist vessels also realized that the speed was increasing and that the trawler was turning away from the graving dock entrance. The master on the *Seaspan Foam* paid out additional line and tried to pull on the *American Dynasty*'s stern, but the force of the trawler's acceleration overpowered and damaged the brake on the tow winch. Meanwhile, the master on the *Charles H. Cates XX* tried to pull the *American Dynasty*'s bow to port and in line with the graving dock entrance, but the towline parted and the trawler veered to starboard and gained further speed. The *American Dynasty* was now rapidly approaching the *Winnipeg*, a Halifax-class frigate moored starboard-side-to the west side of Pier 3C at the Canadian Forces Base, undergoing maintenance. Numerous shipyard workers and uniformed personnel were on board the *Winnipeg*.



Aerial view of Esquimalt Harbor. The graving dock to which the *American Dynasty* was headed is located in the upper right. Overlaid in the image are icons (not to scale) representing the *American Dynasty* and the *Winnipeg*. (Background by Google Earth)

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The *Winnipeg* under way in 2009. (Photo by the Government of Canada)

The chief engineer was unaware of the impending collision and continued his efforts to manually close the breaker connecting the auxiliary generator to the main switchboard to regain electrical power. He also tried to close the breakers for both shaft generators to energize the switchboard, but failed. Shortly thereafter, the auxiliary generator shut down. The chief engineer left the engine room and entered the machinery space to investigate why the auxiliary generator had stopped. About this time, the master ordered the anchor dropped and tried to sound the trawler's whistle, which had not been tested before leaving Seattle and which was nonfunctioning. Neither the master nor the pilots tried pressing the main engines' emergency stop buttons, which were located prominently on the bridge control console. Pressing these buttons would have stopped the propeller shaft from rotating and would have reduced the trawler's speed.



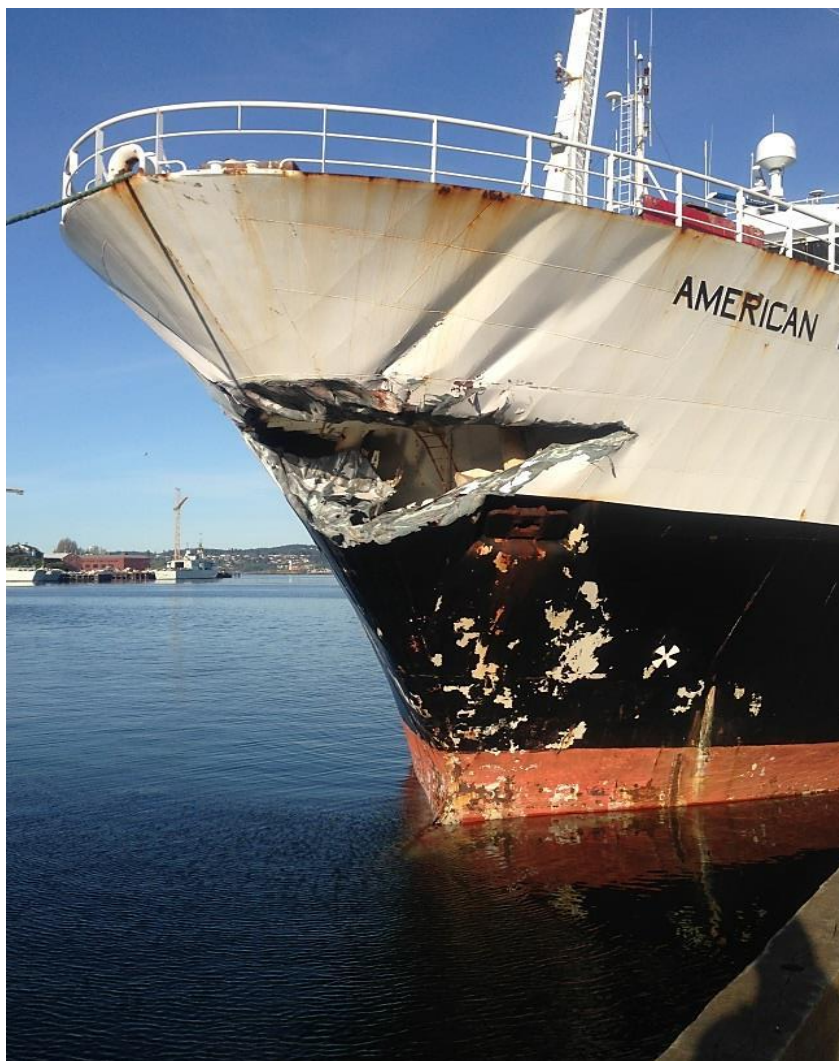
Section of the *American Dynasty*'s bridge control console with the red emergency stop buttons. (Photo by the NTSB)

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The speed had now increased to 5 knots, and when it became obvious that a collision was imminent, the crew abandoned the attempt to use the anchor.

At 0817, the bow of the *American Dynasty* struck the port side of the *Winnipeg*. The collision causing the frigate's stern to pull away from the dock, damaging the vessel's starboard side and Pier 3C. Six shipyard workers on board the *Winnipeg* sustained minor injuries in the collision.

The *American Dynasty*'s bow shell plating, forepeak tank, chain locker, and deck plating were deformed as a result of the collision. The damage was estimated at \$450,000.



Damage to the bow of the *American Dynasty*. (Photo by the NTSB)

The *Winnipeg* sustained buckled deck plating and indentations in the shell plating on both port and starboard sides. A section of steel rebar penetrated the shell plating at frame 14. At the stern, the starboard side of the transom corner above the waterline made contact with the pier and was damaged. No damage estimate was released for the *Winnipeg*, but its damage was substantially greater than the *American Dynasty*'s.

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Left, damage to the *Winnipeg's* port side; right, damage to the starboard side. (Photos by TSB Canada)

The concrete and wood fenders of Pier 3C were crushed when the *Winnipeg* made contact with it. Forty feet of concrete pier were crushed, and 100 feet of wooden beams were split and displaced. The cost of repairs to the pier was estimated to be \$75,000.



Damage to Pier 3C at the Canadian Forces Base in Esquimalt. (Photo by TSB Canada)

In addition, harbor assist vessels *Seaspan Foam* and *Charles H. Cates XX* sustained damage to their towing equipment when the *American Dynasty* began to accelerate. No cost estimate was available for these repairs.

Toxicological testing was conducted on the *American Dynasty* crew, and the results were negative.

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After the accident, investigators examined all of the equipment to determine the cause of the power loss. The decrease in electrical load that occurred when the master shut off equipment, such as the bow thruster motor, caused a change in the auxiliary generator's speed and frequency. This change, in turn, likely caused the generator breaker to trip open on the main switchboard. Ultimately, the auxiliary generator's diesel engine also shut down.

Investigators found a damaged magnetic pickup sensor on the auxiliary generator's diesel engine. This sensor was supposed to emit a signal to the engine's speed control unit, allowing controllers to regulate the engine's speed; if the sensor failed, the engine was designed to shut down. However, investigators discovered that a failsafe feature on the auxiliary generator's control panel had been disabled with a bypass jumper wire, and this prevented the engine from shutting down when the sensor failed. It could not be determined when or why the failsafe had been disabled, nor why the auxiliary generator's engine eventually shut down despite the bypass.

Because the emergency generator was not set to start automatically and accept the electrical load once the auxiliary generator shut down, the trawler's emergency batteries should then have provided power to the CP control system. However, investigators found that the batteries, which were supposed to automatically supply power to several of the trawler's essential systems during a power loss, were incapable of holding a sufficient charge. Although the crew kept a log that tracked the testing of the batteries, no established schedule was in place for their maintenance or replacement. All of the batteries had last been replaced in 2009.



***American Dynasty's* auxiliary generator (left); the generator's damaged magnetic pickup sensor (right). (Photos by the NTSB)**

Further, investigators found that the CP system had a leak in the hydraulic oil distribution box, and the actuator allowed hydraulic oil to leak by, which enabled the propeller pitch to be in the ahead-direction during a power loss. The CP oil distribution system and seals were scheduled for overhaul during the Esquimalt shipyard period.

The *American Dynasty's* heading change to starboard was attributed to the trawler's forward progress with a slight deflection of the rudder of about 2.5 degrees to starboard and a starboard 10-degree bow thruster pitch before the motor was shut off. When the trawler's speed accelerated, the harbor assist vessels could no longer control the heading.

According to the master's work/rest/sleep history, he had been working for 16 consecutive hours and had been awake during the entire transit from Seattle to Esquimalt.

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Further, as relief master, he was not fully familiar with the *American Dynasty*'s bridge equipment, such as the AIS, which he needed assistance to activate. Also, he and the chief engineer had not agreed on an arrival plan with identified risks or contingencies, such as procedures during loss of power to the CP control system. Finally, although the vessel company had a computerized tracking system for shipboard maintenance, this system did not include procedures or schedules for critical components, such as the batteries and the whistle. The system was based on class requirements for maintenance but did not include original manufacturer recommendations, such as the need to examine the CP hydraulic components at 80,000 hours.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the collision between the *American Dynasty* and the *Winnipeg* was the insufficient planning between the *American Dynasty*'s master and chief engineer regarding vessel arrival procedures and emergency maneuvering, and the poor crisis communications between the bridge and the engine room. Contributing to the accident was the status and condition of the *American Dynasty*'s emergency generator and emergency batteries, which were not prepared to supply power at a critical time.

General Tips for Safe Vessel Transits and Emergency Maneuvering

Before a vessel transit, establish a plan outlining procedures and expectations for departure, arrival, and key points along the way. Plan ahead for potential emergencies and how to resolve them. Have critical stations manned by qualified personnel at key points in the transit. Always be prepared to act when necessary.

Pay close attention to the following factors. Test your systems,¹ and train your crew accordingly:

- Auxiliary and emergency equipment is set to activate automatically should your primary equipment shut down. It should be well maintained and up to date.
- Emergency batteries are in good condition, charged, and tested.
- Various alarms and shutdown mechanisms on board the vessel are set to activate properly in an emergency. The whistle should function correctly.
- A functioning backup system is in place for communicating should your primary method fail, and everyone knows how to use it.

¹ Consult 33 *Code of Federal Regulations* 164.25 for more detail re. equipment testing

Vessel Particulars

Vessels	<i>American Dynasty</i>	HMCS <i>Winnipeg</i> FFH 338
Owner/ operator	American Dynasty, LLC/ American Seafood Company, LLC	Government of Canada
Port of registry	Seattle, Washington	Ottawa, Ontario, Canada
Flag	United States	Canada
Type	Commercial fishing vessel/ factory stern trawler	Halifax-class, Naval patrol frigate
Year built	1975	1994
Official number (US)	951307	FFH338
IMO number	7390428	FFH338
Construction	Steel	Steel
Length	240 ft (73.5 m)	439.8 ft (134.1 m)
Draft	28 ft (8.5 m)	16 ft (4.9 m)
Beam/width	54.1 ft (16.5 m)	53.8 ft (16.4 m)
Gross and/or ITC tonnage	3,659 gross tons; 5,111 ITC tons	5,000 ITC tons
Engine power; manufacturer	2 x 4,000 hp (2 x 2,940 kW) Bergen diesel engines	2 x 33,606 hp (2 x 25,060 kW) GE gas turbines; 8,880 hp (6,562 kW) Pielstick diesel engine
Persons on board	9 crew and 3 pilots	Exact number unknown; vessel was moored

For more details about this accident, visit www.nts.gov/investigations/dms.html and search for NTSB accident ID DCA13RM018.

Adopted: February 3, 2015

TSB Canada led the accident investigation and invited the United States to join as a substantially interested state. The United States Coast Guard accepted the invitation. Two investigators from USCG Sector Puget Sound and one from the NTSB traveled to Esquimalt and cooperatively interviewed participants and examined the damage. Because the *American Dynasty* was a US-flagged vessel involved in a major marine casualty, the NTSB was required to investigate, determine probable cause, and issue a report on this accident. TSB Canada's Marine Investigation Report M13W0057 is available to the public at www.tsb.gc.ca.